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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/813,532	03/30/2004	Kuang Hsi-Wu	29171/39345	5318

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EXAMINER

MAZZUCA JR, DOUGLAS

ART UNIT PAPER NUMBER

3726

DATE MAILED: 01/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/813,532	HSI-WU ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Douglas E. Mazzuca	3726	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 March 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-45 is/are pending in the application.
- 4a) Of the above claim(s) 1-26 and 45 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 27-44 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 3/20/2004 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Election/Restrictions*

1. Claims 1-26, and 45 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 11/25/2005.
2. Applicant's election without traverse of claims 27-44 in the reply filed on 11/25/2005 is acknowledged.

### *Priority*

3. Applicant's claim for the benefit of a prior-filed application under 35 U.S.C. 119(e) or under 35 U.S.C. 120, 121, or 365(c) is acknowledged. Applicant has not complied with one or more conditions for receiving the benefit of an earlier filing date under 35 U.S.C. [1] as follows:

The later-filed application must be an application for a patent for an invention which is also disclosed in the prior application (the parent or original nonprovisional application or provisional application). The disclosure of the invention in the parent application and in the later-filed application must be sufficient to comply with the requirements of the first paragraph of 35 U.S.C. 112. See *Transco Products, Inc. v. Performance Contracting, Inc.*, 38 F.3d 551, 32 USPQ2d 1077 (Fed. Cir. 1994).

The disclosure of the prior-filed application, Application No. 09/665,257, fails to provide adequate support or enablement in the manner provided by the first paragraph

of 35 U.S.C. 112 for one or more claims of this application. The prior-filed application does not disclose a method for strengthening an exterior insulation layer on an exterior surface of the skin of a cryogenic fuel tank. The before mentioned art has to do with strengthening the interior (**column 3 lines 41-44**) of an aircraft fuselage (**column 1 lines 11-13**) and mentions nothing about strengthening the exterior of a cryogenic fuel tank.

#### ***Specification***

4. The disclosure is objected to because of the following informalities:

On page 9, line 23, the word "strong" should read --stronger--.

Appropriate correction is required.

#### ***Claim Objections***

5. Claim 38 is objected to because of the following informalities:

Claim 38 is dependant upon claim 37, which specifically states the action of pouring a liquid foam layer. Yet claim 38 states an action of spraying a foam layer.

These two terms are inconsistent and conflict with each other. It is suggested that claim 38 be revised to depend on claim 36.

Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 27-29, 31-32, 34-35, 36, and 39 are rejected under 35 U.S.C. 102(e) as being anticipated by Lak et al. (US Pub No. 2004/0256395 A1). In regard to claims 27, 28, 31, and 34, Lak et al. disclose the following:

A method for strengthening an exterior insulation layer on an exterior surface of a skin of a cryogenic fuel tank, the method comprising (**paragraph 0001, lines 1-4 of paragraph 0006**): providing, by spraying, a quantity of a non-flammable polymer foam material (**paragraph 0003**) and a reinforcing material (**paragraph 0033 lines 1-4**), while the foam material is in a liquid state; combining the polymer foam material and the reinforcing material to form a composite insulating layer; and substantially simultaneously affixing the composite insulating layer in an uncured state to at least a substantial portion of the exterior surface of the skin (**paragraph 0034**).

8. Concerning claims 29 and 32, Lak et al. disclose spraying the exterior surface of the skin of the fuel tank with the foam material to form a first layer of foam material thereon, as explained above. Lak et al. also disclose placing at least one sheet of reinforcing material over the first layer of foam material (**paragraph 0036 lines 1-5**) and spraying a second layer of foam material on the sheet and the first layer (**paragraph 0032 lines 10-11**), and curing the foam material layers (**paragraph 0034 lines 8-9**).

9. As to claim 35, Lak et al. disclose adding, placing, and adding are repeated a desired number of times to achieve sufficient strength (**paragraph 0032, lines 10-11, paragraph 0039 lines 2-5**).

10. In regard to claim 36, Lak et al. disclose securing at least one reinforcing material layer adjacent the exterior surface of the skin (**paragraph 0036, lines 3-6**); adding a foam material layer in the liquid state in such a manner to substantially encapsulate the reinforcing material layer in the foam material layer; and curing the foam material layer (**paragraph 0036 lines 6-10**).

11. Regarding claim 39, Lak et al. further disclose: adding a sufficient amount of reinforcing material (**paragraph 0039 lines 2-5**) so that the composite insulating layer has a compressive strength and a tensile strength (**paragraph 0033 lines 1-4**) sufficient to prevent the composite insulating layer from fracturing and being separated from the fuel tank as a result of thrust imposed on the composite insulating layer during a launch and ascent to space when the fuel tank is attached to a space shuttle orbiter (**paragraph 0045**).

***Claim Rejections - 35 USC § 103***

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lak et al. (US Pub No. 2004/0256395 A1) in view of Sharpe et al. (US Patent No. 4,077,921). While Lak et al. disclose all the claimed information, as listed above, Lak et al. fail to mention the addition of discrete strengthening fibers to the insulating material before being affixed to the surface of the skin. Sharpe et al., however, teach adding a plurality of discrete strengthening fibers to the insulating material before the foam material is affixed to the exterior surface of the skin. Sharpe et al. teach adding glass fibers to a spray mixture, which is to be applied to the external fuel tank (**column 5 lines 21-22, lines 35-39; column 6 lines 26-27**). The purpose of adding the glass fibers to the foam material is to increase the strength of the foam significantly. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to add strengthening fibers such as glass to the foam in order to act as a reinforcing agent.

14. Claims 33, 37-38, and 40-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lak et al. (US Pub No. 2004/0256395 A1) in view of Liu (US Patent No. 5,515,216). In regard to claims 33, 37-38, and 40-41, Lak et al. disclose the action of spraying the liquid foam over the reinforcing material (Lak et al. disclose the use of

Nomex™, also known as poly(*m*-phenylene terephthalamide) as a reinforcing material (**paragraph 0033 line 4**)), and the skin layer of the external fuel tank, yet fails to mention the action of pouring the liquid. Lui teaches pouring (**claims 16 and 17**) the polyisocyanurate liquid foam (**column 4 lines 52-65**). The advantage of pouring the foam rather than spraying the foam is to have better control over foam placement over the object. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to pour the foam over the reinforcing material over the skin of the external fuel tank in order to have better control over where the foam is placed and how much is dispensed over an area. Furthermore, it would have been obvious to use polyisocyanurate foam to cover the external fuel tank because of its great ability as a thermal insulator.

15. Claims 42 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lak et al. (US Pub No. 2004/0256395 A1) in view of Liu (US Patent No. 5,515,216) and further in view of Applicants Admitted Prior Art (APA). Lak et al. and Liu both disclose the use of reinforcing fibers in the polyisocyanurate foam; yet fail to mention the size of the fibers, or the cell size of the foam. However, APA teaches carbon nanotubes have been a known art since 1991 (**page 9 lines 18-29**). Furthermore, APA teaches the size of known carbon whiskers (**page 9 lines 8-12**). APA also teaches polyisocyanurate foams having a cell size of about 200  $\mu\text{m}$  (**page 8 lines 27-28**). The purpose of placing nanotubes or carbon whiskers in the foam is to greatly increase the structural stability of the foam. Therefore it would have been obvious to one of ordinary



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skill in the art at the time the invention was made to place nanotubes or carbon whiskers in the foam to increase the structural stability of the foam.

***Allowable Subject Matter***

16. Claim 43 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Jacobina (US Patent No. 4,692,477), Blount (US Patent No. 4,377,646), Hofer (US Patent No. 4,034,137), Bowen et al. (US Patent No. 6,460,721).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas E. Mazzuca whose telephone number is (571)272-7813. The examiner can normally be reached on 7:30AM-4PM Mon-Fri.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc Jimenez can be reached on (571)272-4530. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Douglas Mazzuca  
January 18, 2006

DEM

  
MARC JIMENEZ  
PRIMARY EXAMINER  
1-19-06